

IN THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (Currently Amended) A fuel cell system, comprising:

a fuel cell [(1)] that has an electrolyte membrane and generates power by using a fuel gas and an oxidizing agent gas;

a storage device [(51)] for water that humidifies the fuel cell [(1)], and

a controller [(100)] that functions to:

judge whether the fuel cell [(1)] can be humidified by using the water of the storage device [(51)], and

limit the operating temperature of the fuel cell [(1)] to below a limit temperature that is lower than during normal operation in a case where it is judged that the fuel cell [(1)] cannot be humidified.

2. (Currently Amended) The fuel cell system as defined in claim 1,

wherein the controller [(100)] further functions to:

judges whether the water in the storage device [(51)] is present in the liquid phase in a predetermined amount or more, and

limits the operating temperature of the fuel cell [(1)] to below the limit temperature in a case where the liquid-phase water is not present in the predetermined amount or more.

3. (Currently Amended) The fuel cell system as defined in claim 1, further comprising:

a thawing device [(60a)] that thaws freezing water in the storage device [(51)]; and

a detection device [(118)] that detects the state of the water in the storage device [(51)],

wherein the controller [(100)] further functions to:

judge whether water of at least a predetermined amount is in the liquid phase in the storage device [(51)], and

limit the operating temperature of the fuel cell [(1)] to below the limit temperature in a case where the water in the storage device [(51)] is freezing and it is judged that the liquid-phase water does not satisfy the predetermined amount, and cancel the limit on the operating temperature of the fuel cell [(1)] upon judging that water of at least the predetermined amount is in the liquid phase in the storage device [(51)].

4. (Currently Amended) The fuel cell system as defined in claim 2, further comprising:

a discharge device [(74)] for discharging the water in the storage device [(51)]; and

a water amount detection device [(151)] that detects the amount of water in the storage device [(51)],

wherein the controller [(100)] further functions to:

predict whether there is a possibility of the water in the storage device [(51)] freezing,

discharge the water in the storage device [(51)] in a case where it is judged that there is a possibility of the water in the storage device [(51)] freezing, and

limit the operating temperature of the fuel cell [(1)] at startup of the fuel cell [(1)] to below the limit temperature until water in the storage device [(51)] has accumulated in the predetermined amount or more.

5. (Currently Amended) The fuel cell system as defined in claim 1, further comprising:

a cooling system having a coolant pump [(52)] that pressure-feeds a coolant that exchanges heat with the fuel cell [(1)] and a radiator [(50)] that performs coolant heat radiation,

wherein the controller [(100)] further functions to:

maximize the coolant flow rate circulated in the radiator [(50)] when the temperature of the coolant discharged by the fuel cell [(1)] is the limit temperature, in a case where the temperature of the fuel cell [(1)] is limited to below the limit temperature.

6. (Currently Amended) The fuel cell system as defined in claim 5, wherein the controller [(100)] further functions to:

control the temperature of the fuel cell [(1)] by limiting the output of the fuel cell [(1)].

7. (Currently Amended) The fuel cell system as defined in claim 6, wherein the controller [(100)] further functions to:

preferentially increase the coolant flow rate to the radiator [(50)] when the operating temperature of the fuel cell [(1)] is limited, and

limit the output of the fuel cell [(1)] in a case where the operating temperature of the fuel cell [(1)] also exceeds the limit temperature after the coolant circulation flow rate to the radiator [(50)] has reached a maximum.

8. (Currently Amended) The fuel cell system as defined in claim 6, further comprising:

a radiator fan [(50a)] that increases and decreases the flow rate of an air stream that passes through the radiator [(50)],

wherein the controller [(100)] further functions to:

preferentially increase the motive power of the radiator fan [(50a)] when the operating temperature of the fuel cell [(1)] is limited, and

limit the output of the fuel cell [(1)] in a case where the operating temperature of the fuel cell [(1)] also exceeds the limit temperature after the motive power of the radiator fan [(50a)] has reached a maximum.

9. (Currently Amended) The fuel cell system as defined in claim 6, further comprising:

a radiator fan [(50a)] that increases and decreases the flow rate of an air stream that passes through the radiator [(50)],

wherein the controller [(100)] further functions to:

limit the output of the fuel cell [(1)] in a case where the fuel cell [(1)] also exceeds the limit temperature after the coolant flow rate to the radiator [(50)] and the motive power of the radiator fan [(50a)] have both reached a maximum, when the operating temperature of the fuel cell [(1)] is limited.

10. (Currently Amended) The fuel cell system as defined in claim 3, further comprising:

a water temperature detection device [(118)] that senses the temperature of the water in the storage device [(51)],

wherein the controller [(100)] further functions to:

judge that water of a predetermined amount or more in the storage device [(51)] is in the liquid phase in a case where the temperature of the water in the storage device [(51)] is at a predetermined temperature that exceeds 0°C.

11. (Currently Amended) The fuel cell system as defined in claim 1, further comprising:

a pressure regulation device (~~18, 43~~) that regulates the operating pressure of the fuel cell [(1)],

wherein the controller [(100)] further functions to:

increases the operating pressure of the fuel cell [(1)] in a case where it is judged that the fuel cell cannot be humidified.

12. (Currently Amended) The fuel cell system as defined in claim 11, wherein the controller [(100)] further functions to:

increase the operating pressure of the fuel cell [(1)] in accordance with a rise in the operating temperature of the fuel cell [(1)] in a case where it is judged that the fuel cell [(1)] cannot be humidified, and operate the fuel cell [(1)] at maximum pressure when the temperature of the fuel cell [(1)] has reached the limit temperature.

13. (Currently Amended) The fuel cell system as defined in claim 3, further comprising:

a combustion device [(30)] that burns a hydrogen-containing gas and an oxidizing agent gas; and

a cooling system that circulates a coolant in the combustion device [(30)], the fuel cell [(1)], and the storage device [(51)] in that order,

wherein the controller [(100)] further functions to:

supply the heat generated by the combustion device [(30)] to the fuel cell [(1)] via the coolant when warming up the fuel cell [(1)], and

warm up the storage device [(51)] by supplying the heat that accompanies the power generation of the fuel cell [(1)] to the storage device [(51)] via the coolant after the warming-up of the fuel cell [(1)] is complete and the combustion device [(30)] has been stopped.

14. (Currently Amended) A startup method for a fuel cell system that comprises a fuel cell [(1)] that has an electrolyte membrane and generates power by using a fuel gas and an oxidizing agent gas; and a storage device [(51)] for water that humidifies the fuel cell, said method comprising:

judging whether the fuel cell [(1)] can be humidified by using the water of the storage device [(51)], and

limiting the operating temperature of the fuel cell [(1)] to below a limit temperature that is lower than during normal operation in a case where it is judged that the fuel cell [(1)] cannot be humidified.

15. (Currently Amended) A fuel cell system, comprising:

a fuel cell [(1)] that has an electrolyte membrane and generates power by using a fuel gas and an oxidizing agent gas;

a storage device [(51)] for water that humidifies the fuel cell [(1)],

means for judging whether the fuel cell [(1)] can be humidified by using the water of the storage device [(51)], and

means for limiting the operating temperature of the fuel cell [(1)] to below a limit temperature that is lower than during normal operation in a case where it is judged that the fuel cell [(1)] cannot be humidified.